



CERN - near Geneva, Switzerland



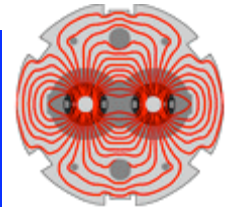
Fermilab - near Chicago, Illinois

LHC@FNAL: Remote Operations Center for LHC and CMS

Erik Gottschalk
Fermilab - Particle Physics Division



New Tools for High-Energy Physics



Collaboration on an international scale is crucial for the US to get the most from a new generation of science projects being built overseas.

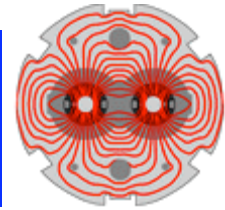
High-energy physics can benefit from new tools:

- Remote operations center (LHC@FNAL, under construction)
- Role Based Access for control systems (under development for LHC)
- Collaborative control rooms
- Collaborative workspaces
 - Distributed shared display walls
 - Shared desktops and shared applications
- Improved communications tools

While a few tools are being **constructed/developed**, there is a need for additional tools. These tools could come from industry or from other science projects (e.g. from ITER, being developed for fusion energy)



Gateway to the LHC & CMS



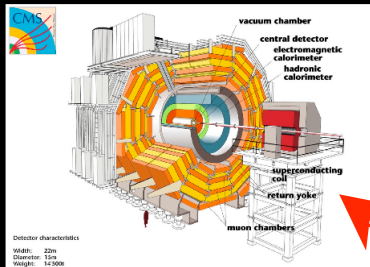
LHC and CMS

- **Large Hadron Collider at CERN, Geneva, Switzerland**
- Proton-Proton collisions
- Beam energy: 7 Terra Electron Volts
- Circumference: 27 km



SuperComputing 2006

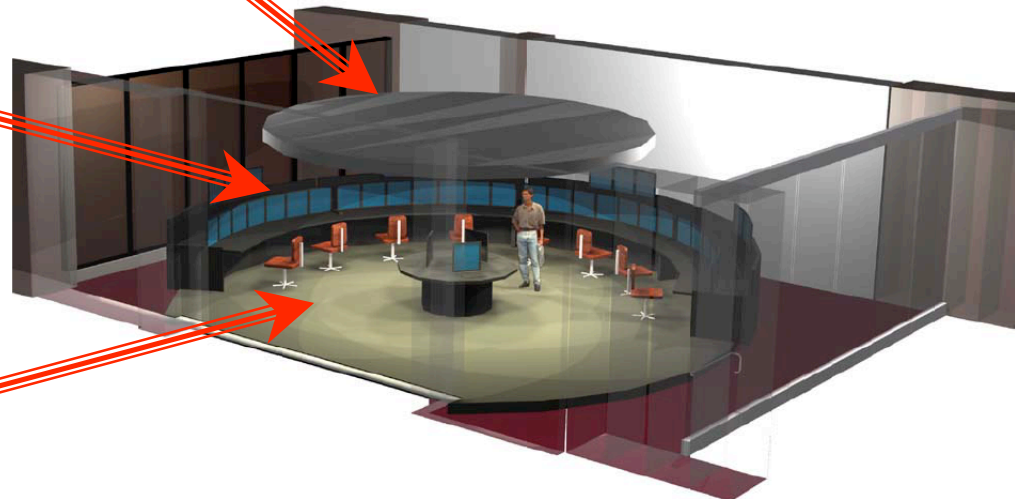
Oliver Gutsche - CMS Global Analysis



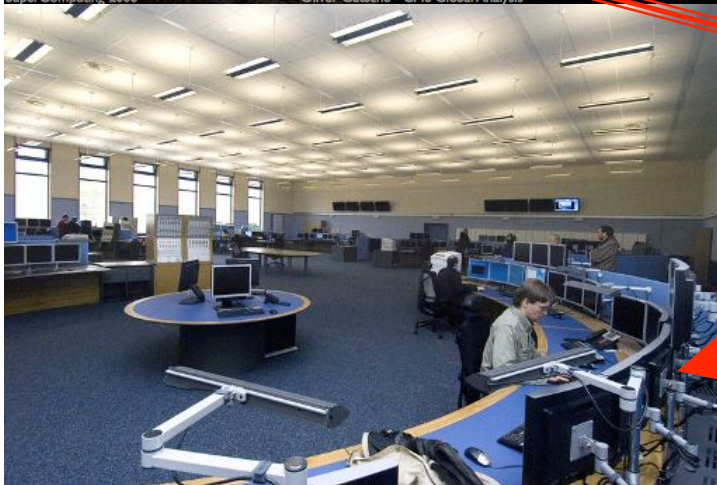
- **Compact Muon Solenoid:**
- One of 4 particle collision detectors at the LHC
- Width: 22m, Diameter: 15m
- Weight: 14,500 t

3

LHC@FNAL: Remote Operations Center for LHC & CMS at Fermilab

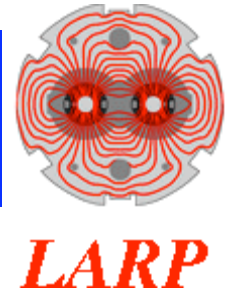


Isometric view of proposed control room





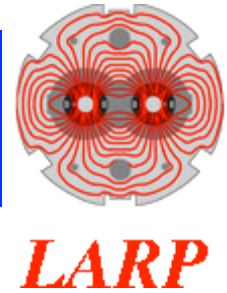
What is LHC@FNAL?



- **A Place**
 - That provides access to information in a manner that is similar to what is available in control rooms at CERN
 - Where members of the LHC community can participate remotely in CMS and LHC activities
- **A Communications Conduit**
 - Between CERN and members of the LHC community located in North America
- **An Outreach tool**
 - Visitors will be able to see current LHC activities
 - Visitors will be able to see how future international projects in particle physics can benefit from active participation in projects at remote locations.



LHC@FNAL Activities



Operations Center:

- Online shifts (LHC and CMS monitoring)
- Offline shifts (monitor GRID computing)
- Shift training for shift activities at CERN
- Call center

Integrated Conference Room:

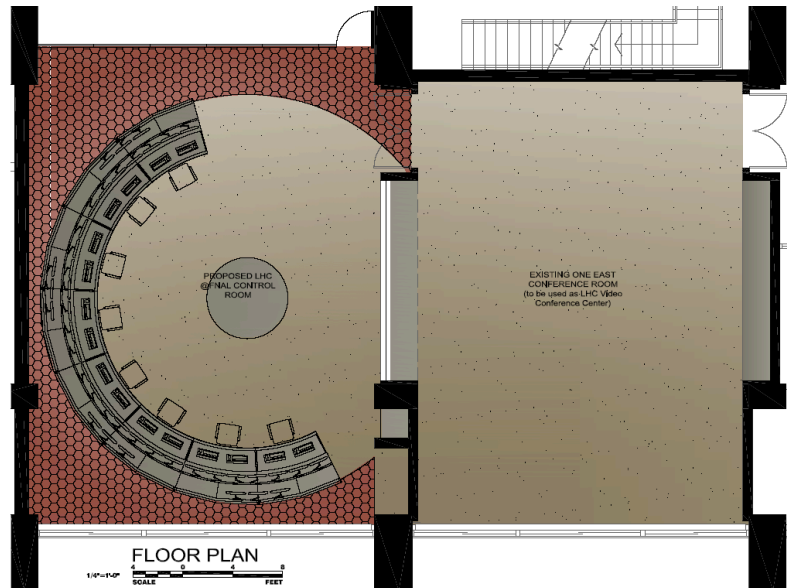
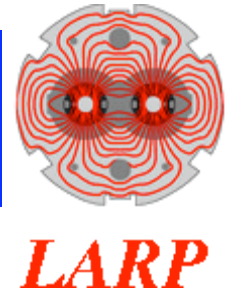
- Daily operations meetings
- Communication with LHC and CMS control rooms at CERN
- Interactive presentations and displays for tour groups

Office Space:

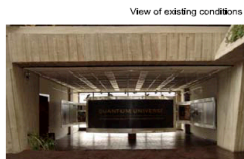
- Small meeting rooms
- Space for detector hardware and electronics experts
- Rest area for shift crew



LHC@FNAL – renderings



View of proposed control room - looking east from Atrium



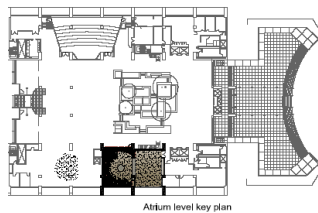
View of existing conditions



View with projection on wall



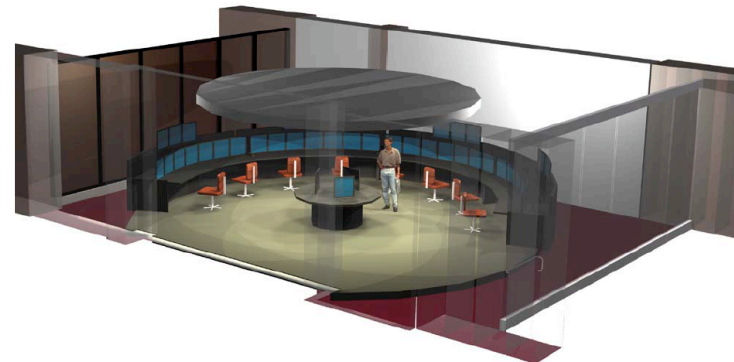
View with projection on glass



Atrium level key plan

LHC @ FNAL OPERATIONS CENTER

ATRIUM LEVEL PROPOSAL
April 25, 2006
FESS / Engineering



Isometric view of proposed control room



